

VHF-FM REPEATER- SYSTEM PLAN

1. **PURPOSE.** This plan will provide an organized, efficient and dependable VHF-FM Repeater network to support all units of the Virginia Civil Air Patrol for its administrative, training, and emergency communications requirements.
2. **SCOPE.** This plan will establish a statewide system of VHF-FM Voice and Digital Repeaters to support all Virginia Wing units in their day to day operations.
3. **DEFINITION.** VHF-FM Voice Repeater Systems are employed principally to improve the usable range of mobile units operating in a given area. VHF-FM Digital Repeater Systems are employed for the automated relay and unattended routing of data transmissions.
4. **AUTHORITY.** The Virginia Wing in 1980, decided to transfer all responsibility for the planning, coordination, installation, and maintenance of the Repeater System away from individual members, squadrons and groups. Since that time, the Wing Headquarters has established funding to maintain all existing equipment and has taken steps to remove all non-CAP owned equipment from the system. Currently, there is no longer any equipment in the system that is not CAP owned. Only selected electronics technicians appointed by the Wing DC have access to the equipment. Other personnel are prohibited from tampering with the system's equipment.
5. **ENHANCEMENTS.** In the early 1970's, the placement of repeaters was uncoordinated. Repeater sites were often picked just for the benefit of a local group of users. The overall interest of the Wing was never considered. When Wing Headquarters assumed control in 1980, a comprehensive planning effort was undertaken to locate repeaters at sites to provide maximum coverage of the state with minimal interference. Operating frequencies were changed to establish a "checkerboard" system of geographic separation. In 1989, the addition of selective access using CTCSS tones was incorporated to the system to further minimize interference. During the 1980's, Wing Headquarters provided funding for new equipment purchases in addition to maintenance expenses. The result was the elimination of sub-standard obsolete equipment for new, current production, Public-Safety grade repeaters. During 1991, Virginia Wing began to install High Level Digital Repeaters at several sites throughout the Wing to improve its Data Communications. In the last few years 3 repeaters were replaced with Motorola Quantar's in preparation for going to narrow band operations
6. **GOALS & OBJECTIVES.** The long-term goal of 100% coverage of the state on VHF-FM is desired. However, understanding that funding sources for the equipment are uncertain, a more realistic set of goals are as follows:
 - a. Install additional Voice Repeaters to provide as near 100% coverage along all Interstate and major US Highways as possible. This is to ensure the safety and efficiency of personnel and equipment enroute to or from an operation.
 - b. Coverage of high-probability search areas. This may include the installation of permanent antenna systems at remote sites without installing a repeater. This allows rapid setup of transportable equipment in an emergency.

- c. Re-fitting of existing sites not equipped with auto-start generators with battery standby systems. This enables continued use during short-term power failures.
- d. Maintain existing Packet Digital Repeater Network to provide future APRS and to support data paths into adjacent Wings and Regions which are still using Packet.

7. PROBLEM AREAS. Since going to a 100% NTIA compliant we have lost a significant number of stations. We were however able to provide critical staff members and all I.C.'s with VHF radios. We still need a significant number of VHF radios. In-service training for current radio operators, as well as new operators, needs to be actively pursued.

8. COMMAND. This plan supersedes all previous VHF-FM Repeater System plans or instructions issued by Virginia Wing Headquarters.

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OPR: DC

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